Upstream public engagement, downstream policy-making? The Brain Imaging Dialogue as a community of inquiry

[accepted for publication in *Science and Public Policy*, forthcoming]

Upstream public engagement, downstream policy making? The Brain Imaging Dialogue as a community of inquiry

Oliver Escobar[1]

UK science and policy networks increasingly advocate 'upstream public engagement', that is, early public deliberation around potentially controversial science and technology. In the last two decades, neuroscience has advanced considerably, and non-medical uses of brain imaging technologies (BIT) are now raising substantial concerns. The 2010 Brain Imaging Dialogue (BID) brought together scientists, health practitioners, sociologists, philosophers, ethicists, religious representatives, citizens, policy makers and legal experts to deliberate on non-medical uses of BIT. I present the BID as a community of inquiry that sought to stimulate policy deliberation in Scotland. The paper tells the story of the process from the perspective of the public engagement practitioners who organised it, drawing lessons about the community of inquiry method and concluding with reflections on the challenges of connecting upstream engagement to ongoing policy making. , Taking cues from practitioners' experiences, I then conclude proposing an institutional mechanism for the uptake of outputs from deliberative processes.

Key words: upstream public engagement, deliberative policy making, public engagement practitioners, brain imaging.

[1] I would like to thank SINAPSE (Scottish Imaging Network –A Platform for Scientific Excellence) and Edinburgh Neuroscience for making this research possible. They granted me access to meetings and communications, as well as to every stage of the BID process and the materials generated. They also supported the dissemination of previous versions of this paper with two travel grants. I want to specially thank Jane Haley for her encouragement and mentorship.

Introduction: Learning by shadowing practitioners

In 2009 I interviewed the Scientific Manager of Edinburgh Neuroscience for a research project about science public engagement (PE) practitioners. After years of running outreach programs, she was about to embark in the organisation of an ambitious deliberative project. That encounter sparked my fascination with the topic of brain imaging and my curiosity about the journey before this practitioner. Over the forthcoming months I would take roles as scribe, facilitator, participant and collaborator, while adopting an ethnographic approach to make sense of the experience. Accordingly, this paper draws mainly on fieldnotes generated through participant observation during 51 hours of fieldwork, including informal interviewing and documentary analysis (i.e. reports, emails). My goal was to understand some of the challenges faced by PE practitioners (or public engagers) who organise policy-oriented multidisciplinary dialogue.

Drawing on interpretive political ethnography (Schatz, 2009), the case study seeks depth rather than breadth. The goal is not to map the challenges faced by *any* engager *anywhere*, but to analyse the predicament of this group of engagers in this particular process, and tease out what can be learned from it. This type of research does not seek to produce generalisations, but to work on "exemplars" that illustrate the unique dynamics of situated practice in order to deepen understanding and open new lines of argumentation and inquiry (Flyvbjerg, 2001, 2004). I developed a number of progressively active roles in the field, from "shadowing" the engagers (Czarniawska, 2008), to facilitating table discussions, and collaborating in other tasks (e.g. designing a public survey). However, for most of the process, I was a scribe. Scribes were tasked with writing minutes, which allowed me to write fieldnotes without distracting participants, interrupting interaction, or planting "seeds of distrust" (Emerson *et al.*, 1995: p. 20).

I have benefited from ongoing conversations with the engagers, not only along the process, but also during the research writing-up and "members-checking" stage (Yanow, 2009). This ongoing communication is typical of abductive ethnographic research into practices and meaning-making processes (Yanow and Schwartz-Shea, 2012).Taking cues from interpretive scholars, I offer interpretations of these practitioners' interpretations, and reflections about my own experience (Geertz, 1973; Bevir and Rhodes, 2003). All in all, the paper foregrounds the often overlooked role of public engagers in setting the theatres of deliberation that increasingly populate the governance of science and technology. If the move towards science PE has been talked into existence through UK policy discourses and networks in the last 25 years (Hagendijk and Irwin, 2006; Irwin, 2006; Thorpe, 2010; Thorpe and Gregory, 2010),

the practice of deliberative public engagement remains at its experimental stage, and we know little about the work of practitioners tasked with translating deliberative ideas into situated practices (but see Chilvers, 2008; Burchell *et al.*, 2009; Pieczka and Escobar, 2013).The paper zooms in and out on practices (Nicolini, 2009), analysing some of the micro-politics of practitioners' critical choices, and sharing thoughts on the macro dimension of institutional capacity for deliberative uptake. I conclude suggesting that some practitioners find themselves trapped in a paradoxical policy landscape. While some policy networks are encouraging science PE, some policy arenas seem to struggle to take into account its results. I therefore conclude highlighting the need to enhance the capacity of representative institutions for the uptake of outputs from external deliberative processes.

The UK science PE agenda: Mainstreaming and upstreaming

The UK PE agenda is often depicted as shaped by a series of key public controversies and policy-driven turning points over the past 25 years (see Irwin and Wynne, 1996; Irwin, 2001, 2006; Wilsdon et al., 2005; Thorpe, 2010; Thorpe and Gregory, 2010; Bauer and Jensen, 2011). In the last decade, we have witnessed the somewhat paradoxical intensification of top-down policy efforts to foster bottom up participation (see Pieczka and Escobar 2013). Examples are major tooling-up operations such as Sciencewise, the ESRC Genomics Network, or the UK Beacons for Public Engagement. Moreover, the evolution from Public Understanding of Science to Public Engagement and Dialogue, has not only been inscribed in policy statements and funding streams (see Rayner, 2003; Burchell et al., 2009), but also embraced by key players in science and technology policy networks, e.g. Royal Society, Parliamentary Office for Science and Technology, Research Councils UK, Wellcome Trust, etc, (Escobar and Pieczka 2013).

Many of these efforts can be framed as attempts to cope with two interrelated challenges. On the one hand, both "the white coat of science" and the "white toga of values" have been shown to be far from hanging in different wardrobes (Latour, 2004: p. 106; Latour and Woolgar, 1979). This recognition was not only foundational of the field of Science and Technology Studies (STS), but it actually reframed much of the broader social and policy sciences of recent decades (Fischer, 2009). As Fischer (1993: p. 333) puts it:

> …the activity of science is a product of the very social world it seeks to explain. Revealing scientific research to involve far more than the passive reception and organization of sense data, postpositivist theory emphasizes science's dependence on the particular constellation of presuppositions, both theoretical and practical, that *prestructure* empirical observations. Thus science, like all human knowledge, is

> grounded in and shaped by the normative assumptions and social meanings of the world it explores.

This takes us to the second challenge: the need to constantly negotiate –in the words echoed by the then Royal Society President - the scientists' "license to practice":

> As the Lords report stressed, the dialogue is about science's 'licence to practice'. Science is, necessarily, run by scientists, but it is ultimately society which allows science to go ahead and we need to make sure that it goes on doing so. So we need input from non-experts to make sure we are aware of the boundaries to our license; and, conversely, we need good channels of communication if we want to extend those boundaries… (Klug, 2000: 4)

The infamous "mood for dialogue" proclaimed by the House of Lords in 2000, has been ever since trumpeted and operationalised by UK networks and institutions. However, that mood has not been so palpable throughout the many citadels of "the scientific community", and the PE agenda hasn't had a smooth ride:

> There has been gradual, sometimes grudging, recognition that mere communication – whilst important – cannot alleviate justifiable anxieties. Now the watchword is 'engagement' and with it, 'dialogue'. The scientific community is beginning to realise, but often reluctantly accept, that we scientists need to take greater notice of public concerns, and relate and react to them. (Wilsdon et al., 2005: 12)

Accordingly, key policy statements have often tried to combine a wholehearted paean to two-way dialogue with a "deep commitment to the 'power-house of innovation'"; a mix that allows "managerial approaches to risk management" to be accommodated alongside "calls for the active involvement of stakeholders (Irwin, 2006: p. 309). Another widespread criticism (e.g. Pidgeon and Rogers-Hayden, 2007: 194) is that PE often occurs when it is too late to engage in meaningful dialogue about technology that is already on the shelves. This critique has rallied support for the notion of "upstream public engagement" (Wilsdon and Willis, 2004), defined by Rogers-Hayden and Pidgeon (2007: 346) as "[d]ialogue and deliberation amongst affected parties about a potentially controversial technological issue at an early stage of the research and development process and in advance of significant applications or social controversy". Although praised in theory, the actual practices that unfold in upstream engagement experiments have begun to undergo close scrutiny (see Pidgeon and Rogers-Hayden, 2007; Rogers-Hayden and Pidgeon, 2007, 2008; Kurath and Gisler, 2009; Tait, 2009; Stebbing, 2009). Most observers reflect on emerging challenges that have watered down initial expectations, including that of developing dialogue processes capable of influencing policy making. This paper seeks to add to this pool of case studies.

Constructing, summoning and performing publics (Braun and Schultz, 2010; Mahony *et al.*, 2010; Warner, 2002) have thus become key activities for scientific communities. The UK

Labour Government (1997-2010) put a premium on PE, and the message trickled down, through funding streams, projects, agencies, research councils, science centres and museums, academic institutions and research institutes. Indeed, the top-down stimuli have been noticeable. It has been more unusual, however, to witness bottom-up approaches, that is, scientific communities seeking to set up upstream dialogue processes in the light of their own concerns. That is the case I present here.

The Brain Imaging Dialogue (BID)

"What Are You Thinking? Who Has the Right to Know? Brain Imaging and its Impact on Society" was the title of the BID program. In this paper, I focus on process dynamics, rather than contents, which have been covered elsewhere (SINAPSE *et al.*, 2010; CORTEX, 2011; Sandercock and Wardlaw, 2011; Sprooten *et al.*, 2011; Vierkant, 2011; Haley *et al.*, 2011; Wardlaw *et al.*, 2011a). Let me introduce the BID by sharing two fragments from the "Background Summary Paper" that participants received on arrival:

> Nothing is more intimate and private than a person's thoughts. New technologies from neuroscience are getting closer and closer to "seeing" what we think. These have many possible applications, not all of them for medical use. They could be used as lie detector tests in courts. To decide if a person is dangerous, even if they haven't committed any crime. To see what we really like and dislike, so that advertising companies can convince us to buy their products. Medical insurance companies could use them to determine if you are a risk or need to pay higher premiums. Mortgage lenders to see if you are truthful in your application. But are all these applications really a good idea? What should we allow, require or prohibit?

> Whether fMRI can achieve these goals remains to be seen, but it raises ethical issues … This use of imaging … is now creating situations not imagined by the scientists who developed the technology and who currently do the medical research. This debate is about how we currently use this technology in Society, how it might be used in the future, what do the public think and how should we control its use without impeding scientific discovery?

The framing of the issues for deliberation is obvious from the outset. Namely, a preoccupation with the ownership of the "license to practice", articulated around the tension of preventing non-medical (mis)uses of Brain Imaging Technologies (BIT), without hindering the medical research agenda (unquestioned throughout the BID process). The fragments reveal an effort to use non-specialist language, as well as carefully chosen examples with compelling rhetorical power. The text also presents medical uses of BIT as being in the safe hands of scientists, while it suggests that unqualified others (e.g. marketing, advertising and insurance companies, mortgage lenders) are using it for non-medical purposes. Although such initial framing is critical, it did not remain untouched as the BID unfolded –indeed, one of the key goals of a deliberative process is to challenge such frames (Schon and Rein, 1994).

A key question is always who initiates upstream engagement. For example, government-sponsored processes are often criticized as rhetorical exercises performed to produce a sense of control over a perceived problem, to "subdue the voices of powerful pressure groups", and to command legitimacy and public acceptance while still reproducing hierarchies of knowledge (Rogers-Hayden and Pidgeon, 2007: pp. 350-351). These are some of the risks inherent in the top-down creation of "invited spaces" for participation (Cornwall, 2008; Chilvers, 2010). The BID constituted an invited space, but the invitation did not come from a government-sponsored initiative. In this case, members of various Scottish neuroscience networks decided to reach out to other communities of practice, as well as citizens, in order to share their concerns, make sense of the situation and provide groundwork for public and policy deliberation. The project was initiated by a broad platform including:

- SINAPSE[2] (Scottish Imaging Network: A Platform for Scientific Excellence; a consortium of 6 Scottish Universities)
- Edinburgh Neuroscience[3] (a multi-partner centre based at the University of Edinburgh)
- Joseph Bell Centre for Forensic Statistics[4] (a multi-partner centre based at the University of Edinburgh)
- Scotland's Futures Forum[5] (civic platform funded by, and based at, the Scottish Parliament)

Representatives from these organisations formed the core group of organisers, and sought funding from various sources. Eventually, they obtained support from the Scottish Universities Insight Institute[6], whose remit is to "mobilise existing knowledge" to inform policy and practice[7], and is directed by a senior civil servant on secondment from the Scottish Government. The BID organisers made sure that their funding application pressed the right buttons, and framed the process as a collective inquiry oriented towards informing policy making in Scotland:

> The key objectives of this programme will be to explore the ethical impact of neuroimaging on society. By stimulating debate and gathering opinion between the general public, societal groups (patients, prisoners), scientists, clinicians, ethicists, legal experts and politicians, we will raise awareness of privacy and ethical issues,

[2] www.sinapse.ac.uk

[3] www.edinburghneuroscience.ed.ac.uk

[4] www.cfslr.ed.ac.uk/index.htm

[5] www.scotlandfutureforum.org

[6] www.scottishinsight.ac.uk

[7] www.scottishinsight.ac.uk/AbouttheInstitute/WhatWeDo.aspx

> determine a cross-section of opinion, and through engagement of users and policy makers, publish reports to guide policy outcomes.

> The programme is relevant to Scotland as Scotland has its own legal system, and its evidence law in particular needs to respond to these new technologies … It also has its separate health system. Scotland has more research scanners per head of population than the rest of the UK and has played a major role in developing MR imaging. We need to consider the implications of a tool which Scotland helped to develop.

In a conversation during the preparation stage, one of the organisers (a scientist turned public engager) reflected on their goals. On the one hand, they intended to put the issue on the policy making agenda:

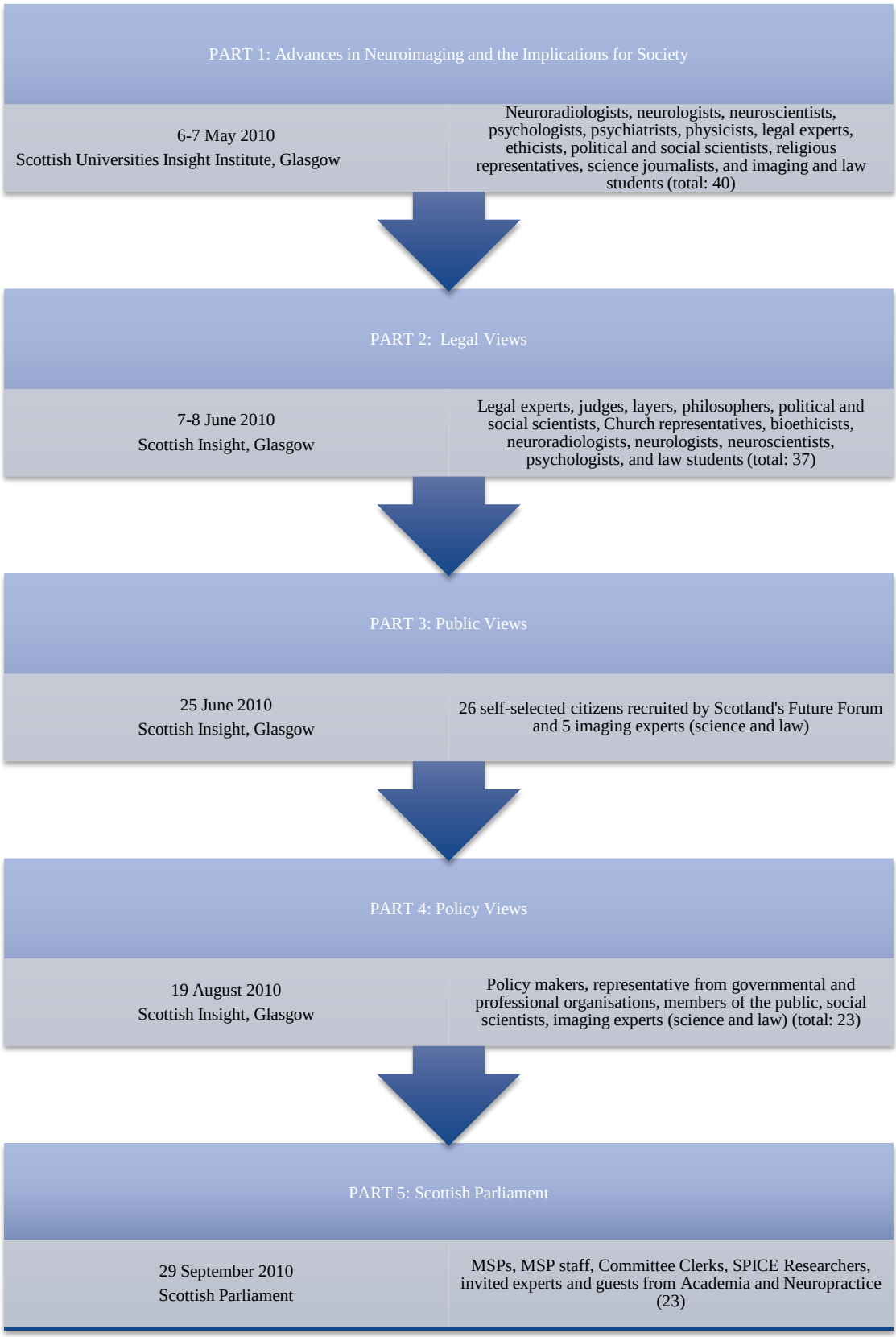
> We are not really expecting legislation, because we're not sure what we want to legislate for or against, we will need to decide first...is there a problem? Maybe there isn't, maybe it's fine and we should leave the market forces run the show [...] What there is is a need for awareness. At the end of the process we want the policy makers and the MSPs [Members of the Scottish Parliament] to be aware that these issues are out there.

On the other hand, they wanted to provide the upstream groundwork for future PE:

> By having this debate, if that debate then becomes wider, like the GM thing with the public, then there is something already there, that can be drawn on, which will hopefully head off the hysteria

The first fragment shows how the engager wanted to make it clear that they approach the BID with an open mind, and determined to let the deliberative process shape their thinking about policy implications. In the second fragment, we find the common trope of the UK *GM Nation?* debate, which has acquired a quasi-canonical status not only in STS (e.g. Rowe *et al.*, 2005; Horlick-Jones *et al.*, 2007; Pellizzoni, 2001) but also amongst public engagers. In this case, it is evoked to benchmark the kind of "hysteria" that the BID process seeks to prevent. It can be argued that the *GM Nation?* imaginary has played a substantial role in drawing PE practitioners' attention towards upstream PE. In this case, it motivated the BID organisers to opt for a carefully controlled process that included selective releases to the media and a sequencing of the BID that privileged expert voices. Figure 1 represents that sequence.

Figure 1. The BID process: What are we thinking? And who should know? Brain Imaging and its impact on society



Notwithstanding the expert bias, the BID included a varied range of voices and perspectives, including those who occasionally challenged

> the agendas and practices of science itself, rather than solely the present or future representations that a society might hold about that science: 'Why this technology? Why not another? Who needs it? Who owns it? Who will benefit from it? Can they be trusted? Who will take responsibility if things go wrong? (Rogers-Hayden and Pidgeon, 2007:354).

It is unhelpful to analyse this type of multidisciplinary, expert-led process in reference to, for instance, deliberative "mini-publics", which have some kind of claim to representativeness of a certain population (Goodin and Dryzek, 2006; Smith, 2009). Instead, the BID was more akin to Dryzek's (2010) deliberative "chamber of discourses", where a range of views are represented, and thus perhaps better understood as a community of inquiry.

The BID as a deliberative community of inquiry

The connection between science and democracy was central to pragmatists like Peirce and Dewey in the early 20th Century. They understood science not simply as a domain of scientists, but as a manifestly social process that demands a broader "community of inquirers" tasked with making sense of scientific development (Bohman, 1999: p. 591). Accordingly, the BID process can be seen as originated by a "community of practice" (Wenger, 1998) reaching out to various others in order to constitute a broader "community of inquiry":

> Common to all communities of inquiry is a focus on a problematic situation… a catalyst that helps or causes the community to form and it provides a reason to undertake inquiry … The democratic community also takes into account values/ideals such as freedom, equality, and efficiency as it considers goals and objectives. The three key ideas—problematic situation, scientific attitude, and participatory democracy. (Shields, 2003: 511)

A community of inquiry brings together "professional knowledge and lived experience", forming an "interpretive community" of citizens and experts who seek "a persuasive understanding of the issues under investigation […] developing arenas and forums in which knowledge can be debated and interpreted in relation to the relevant policy issues" (Fischer, 2003: p. 222). In the following fragment, one of the BID engagers explains their snowballing recruitment strategy and the thinking behind it:

> We collectively put together the invite list […] We used personal contacts, asking people from relevant committees for recommendations, I spoke to Michael Gazzaniga and got suggestions from him, I also searched on internet. [Others] suggested imaging

> people who had written articles also expressing concern. We wanted UK, Europe and USA people and from many different fields.
>
> [Interviewer: What was the overall goal of the process?] To understand whether there were issues that needed to be addressed at a policy level.

PE practitioners, especially those who are novices to deliberative approaches, often face the question of timing: when is the best moment to convene a public? If it's done too downstream, the exercise may become toothless or tokenistic. If it is too upstream, no one may feel compelled to participate. This engager put it as follows during an interview:

> At the minute, for something like this, I don't think that the public will get hysterical about it. The reason why they got hysterical about the genetic food thing was that it was already in the shops, they were eating it. This technology that we are talking about isn't being used against them at the minute. There are other issues related to its use, but most of them won't impact on most members of the public. […] Most of our debate will come from the experts, but with the public behind highlighting the issues.

The 'public' is a problematic concept. Publics are not pre-existing entities, but contingent assemblages resulting from specific contexts, practices and dynamics (Warner, 2002). Research has shown how PE processes do not simply capture a public that is 'out there', but they actually construct their publics by convening and summoning them through various contingent practices (Braun and Schultz, 2010; Mahony et al., 2010; Newman and Clarke, 2009). The BID organisers succeeded in attracting to the process members of various expert communities, but left the non-expert-led phase in the hands of Scotland's Futures Forum, who struggled to create a public for their stage. Accordingly, this was a community of inquiry dominated by expert voices, although it included participants from diverse backgrounds, and with different and often opposed views. Moreover, in the absence of a single hegemonic language of expertise, reciprocal understanding proved problematic throughout, and demanded more careful deliberation about facticity and values.

A diverse and multidisciplinary community of inquiry, troubled by the demanding task of discursively constructing "joint fact-finding" pathways (Laws and Forester, 2007), can entail struggles that disrupt the stereotypical expert-led consensus and engagement dynamics of some PE processes. For example, during the BID, Part 1 was one of puzzlement: many imaging experts seemed startled when some of their peers suggested that BIT could actually do what they deemed impossible. Moreover, one of them suggested that it not only could, but it should. The context for the following fragment from my fieldnotes is that in previous sessions the dominant view, and emerging consensus, had been that BIT could not reliably produce the results alleged by neuro-marketing advocates.

> Prof. Gemma Calvert (WMG Innovative Solutions) talks about 'neuroscience in industry'. She is an advocate of Neuro-marketing, defined as "consumer research measuring biology instead of psychology" and "measuring neural responses in the brain". She prefers the term Applied Neuroscience rather than neuro-marketing, and insists that it is "good for British industry! 80% of new products fail upon launch" and therefore "it is unethical not to do anything to help here". Then she goes on to criticise the reliability of "focus groups" used for the same purpose.
>
> She then explains BI is currently used by: global packaged goods, flavour and fragrance houses, media owners and planners, advertisement agencies, pharmaceuticals, digital gaming and services. Current applications include: measuring effectiveness of communications (public messages), neuro-ergonomics (human-machine interface), validate focus group output, de-risking marketing decisions, evaluation of traditional market research tools, patents (back up product claims), PR opportunities…These industries' R+D departments are mostly formed by postdoctoral academics, "scientists like yourselves", she remarks.

Here Prof. Calvert[8] was not only arguing that neuro-marketing works, but also that it would be "unethical" not to use it. She highlighted the also tentative nature of other current methods ("focus groups"; "psychology"), and then went on to list the variety of BIT current purposes, uses and fields. Throwing another dimension into relief, she questioned the taken for granted mistrust towards scientists working in industry –instead of academia or the public sector. Later on she reminded other table-discussion participants that many scientific advances have come precisely from "scientists working for industry". Her interventions dislocated some of the underlying dichotomies and frames that had been formed in previous discussions (e.g. responsible and precise medical/academic researchers vs. obscure and lousy industry researchers). This re-framing created visible puzzlement in the room, with many shaking heads. It unsettled the emerging consensus, and forced participants to park the scientific debate about what things can be actually done with the technology (and with it the aspiration of solving the issue through science), and move on to normative engagement with the issue of what uses of BIT should or should not be permitted.

This example illustrates how a community of inquiry can bring assumptions into the open, and problematise stereotypes and expert frames that may prevent deeper deliberation (cf. Kerr *et al.*, 2007). In this sense, it may be a response to the malaise pointed out by Collins (2009: p. 30): "Scientists have been too dogmatic about scientific truth and sociologists have fostered too much skepticism". A community of inquiry forces all participants to investigate the issues through collaborative dialogue that focusses first on shared sense-making. In the process, they

[8] As many other participants in the BID, Prof. Calvert's attendance was jeopardized by the Icelandic ash cloud that closed the skies at the time. Technology made her participation possible; she gave a presentation and also joined two of the table deliberations. However, her limited virtual presence was unfortunate, especially given that she held a dissenting perspective. It prevented her contribution to the conversations during breaks and meals where most of the participants engaged in small-group sense-making, working out their thoughts from talks and discussions, and forging the bones of a certain consensus (pro-regulation).

share meals, drinks, breaks and lots of informal talk. Everyone brings their knowledge and ways of seeing to bear on the others', and there is not escape to the safe haven of compartmented disciplines or policy silos.It also requires a huge effort to overcome jargon divides and taken for granted assumptions (see Lansdell, 2009). The BID exemplified some of the key features of the community of inquiry process. It was a community because it constituted a safe space to engage in meaningful dialogue, understood as conversational dynamics that build high quality relationships amongst participants. This relational work allows for conversations based on inquiry rather than advocacy dynamics (Escobar 2011b). Inquiry dynamics promote deep exploration and critical engagement with the issues, but avoid the typical shallow exchange of adversarial debate where mostly pre-packaged messages are traded in a series of well-rehearsed monologues. In deliberative dialogue, the focus on relationship-building and deep understanding that characterises dialogue informs and modulates the posterior advocacy-based weighing of alternatives and decision-making that characterises deliberation (Escobar 2011b).The engagers' world is one of consequential designs and micro-political strategies. Perhaps one of the critical choices they made was to sequence the BID according to areas of expertise (see Figure 1 above). The bulk of participants in the first two phases were cross-disciplinary experts who discussed the current state of BIT and the legal and ethical implications. The third and fourth phases brought to the process additional members and representatives of various publics and policy makers. The organisers wanted the experts to work out the issues at stake (e.g. what can the science do? what are the legal and ethical implications?) before incorporating other voices. As Chilvers (2008:180) points out, this separation of expert analysis and public deliberation is highly problematic. For instance, it leaves to the experts the framing of the issues, narrowing the potential scope for non-expert input. However, this somewhat implies that experts act as a monolithic block and consensus comes easily. That was not the case in the BID, where disensus abounded not only across but also within areas of expertise.

I was also struck by the shared demystification of science that unfolded throughout the process. To see a scientific community hesitating, incapable of publicly performing any sort of consensus, and discussing not only technicalities but also moral and practical implications, was an eye opener for those previously exposed to monolithic representations of such communities. Each speaker was extremely candid in showing the contested nature of the 'scientific facts' under scrutiny in the first leg of the BID. Judging by the reactions of some scientist participants, it was also an eye-opener for them to witness disagreement around what can and can't be done with a technology that they thought they knew well (e.g. neuro-marketing discussion above). Accordingly, all participants, including natural scientists, got a

glimpse of what is meant by STS references to the contested / constructed / discursive nature of 'fact' and 'evidence'.

Accordingly, there were many moments of puzzlement in the room. This was not a dialogue dominated by any single one voice, and it was revealing to see that the people most concerned with emerging uses of BIT were scientists themselves. Many have depicted deliberative exercises as prone to being captured by interest groups (Irwin, 2006; Tait, 2009). This did not happen in the BID, although the voices of public sector scientists –a diverse interest group in itself- were clearly prominent throughout. In this sense, it can be suggested that the BID was a reaction by a scientific community to the threat that commercial uses of the technology poses to their own research agendas, and thus a struggle to define who should have license to practice in this area. However, what is remarkable about the BID is that this scientific community reached out to various others in order to make sense of their situation and concerns. They sought to create a public sphere for deliberation.

Indeed, one of the strengths of the BID community of inquiry was its cross-disciplinary nature. By bringing together a diverse group of experts and lay participants, it broadened the framing of the issues, thus teasing out their multifaceted implications. Rayner (2003; see also Tait, 2009) shows scepticism about substituting the expertise of scientists for the expertise of those deploying deliberative techniques. I believe this misses the point: although participatory processes can be used in managerial ways to substitute traditional expert-led committees (Chilvers, 2008), it can also be used to create communities of policy inquiry that bring together a range of disciplinary and experiential *knowledges* (Bohman, 1999; Callon *et al.*, 2009). This takes us to the issue of legitimacy and representation that has occupied so many researchers of participation. In this type of participatory process, where the involvement of all affected is unfeasible, the aim is not representation in the traditional sense, but "discursive representation" (Dryzek and Niemeyer, 2010). That means ensuring that a diverse range of discourses are represented and enacted in the process. A community of inquiry is thus an exercise in shared intelligence and value-based deliberation oriented to sense making and problem solving. The more diverse it is the more challenging and, arguably, legitimate it becomes. It would be too easy to dismiss the BID because of its expert-led dynamics, especially when, at this upstream stage, only experts from neuroscience, law, ethics, politics, etc, seem concerned with opening public debate. If they were to wait until alternatively organised publics demanded it, it might not happen until the technology is used for non-medical purposes in Scotland. This would replicate the reactive modus operandi that upstream engagement seeks to prevent. Despite its pitfalls, the BID offers a rare example of a scientific network seeking to collaboratively explore the societal implications of technology, opening

itself to public and cross-disciplinary scrutiny, gathering intelligence on the subject from diverse, sometimes opposed, perspectives, and doing upstream groundwork for public and policy deliberation. In doing so, this scientific community seems to be part of the small minority of scientists that can imagine themselves not only as contributors to, but also as enablers of, deliberative processes (see Besley and Nisbet, 2011: p. 12).

Taking the BID to the Scottish Parliament

In September 2010, we took the final BID report (SINAPSE et al., 2010) to the Scottish Parliament. Scotland's Futures Forum (SFF) arranged a 1-hour "working lunch" with MSPs and Parliament researchers. As Kadlec and Friedman argue, the end of a deliberative process is not the end of the engager's work, but the beginning on a "new and most challenging phase of it, an *activist* phase" (2007: p. 19; emphasis in the original). In this phase, public engagers strive to make the process count.

We were a delegation of over a dozen participants and organisers, and there was mounting excitement as we enter Committee Room 1.2 at the Scottish Parliament. Disappointment, however, followed pretty soon. The convener from SFF opened the meeting apologising for the "lack of policy makers in the room", and explained that some committees had overrun preventing MSPs (Members of the Scottish Parliament) from coming. Two of the BID organisers went on to present a summary of the report to a handful of newcomers. The organisers' frustration was palpable. Thankfully, around 15 minutes later some parliamentary researchers and 2 MSPs joined us and suggested ways of taking things forward. One MSP offered to bring the issue to the Health Committee, as well as to debrief the Science and Technology Committee. They also gave advice about creating "clear messages" so that this is ready to go into the spotlight as soon as media attention increases. During the last 10 minutes we felt a sense of relief, as the session seemed productive in terms of getting the issue on the agenda. This encounter, which was thought to be the end of the process, became actually another beginning. One that the BID engagers were not ready for.

In the forthcoming months there was some progress. A Motion was tabled, but it wasn't selected. A presentation to another committee and a discussion with SPICe personnel (Scottish Parliament Information Centre) didn't elicit any follow up. The Justice Committee was scheduled to look at the report in private in November 2010, but there was no feedback. In the meantime, the core group of BID organisers began to dissipate as some left their organisations. Eventually, they ran out of energy to cope with the frustrations of the activist

phase that must crown a deliberative process. An engager put it this way in an email conversation:

> The MSPs and researchers at the Parliament (the ones who turned up anyway) grasped the issues readily and were very helpful in person. Follow-up was more problematic - the Motion was not well written (we did have the opportunity to input on this but we didn't have any idea of what a Motion should look like), […] and I have no idea what resulted from the appearance at the Committee (we don't get any feedback so it is hard to judge impact).

> I was delighted we were able to talk to policymakers/MSP's at all […] However, although I appreciate that people were interested in the issues, I think it has all rather drifted away as it isn't something of immediate usefulness to Parliament. We ourselves have also run out of steam a bit, which is a shame. I feel we identified what we realistically could achieve and managed that (raised awareness, identified the issues, identified possible ways forward). The 'wish-list' stuff - actually getting something significant done (monitoring committee, regulation of MRI practitioners) I can't see us having the energy to keep pursuing as I think it would require a tremendous amount of constantly revisiting the issues with policymakers. I hope I'm wrong!

Practitioners live in a "world of tangled, muddy, painful, and perplexing concrete experience" (W. James, 1907, p. 21; quoted in Shields, 2004: p. 352). For the BID organisers, this was their baptism of fire as "deliberative practitioners" (Forester, 1999). Most of them were university scientists turned into public engagers. The fragment above highlights the amount of political work and policy-making know-how that is necessary to navigate this phase of a deliberative project. This has rarely been acknowledged in the literature about PE practice. To my mind, public engagers working on deliberative processes are political actors engaged in what Colebatch's calls policy work (2005; 2010). They are nodal agents in emergent theatres of participatory politics, and face the challenge of negotiating the frictions between practices of representative and participative democracy (e.g. Hendriks, 2006; Hoppe, 2011). This political dimension of PE practice is often neglected in PE training and job descriptions. With their emphasis on mastering science communication and, occasionally, facilitation skills (e.g. Escobar, 2011b; Faulkner, 2011), PE practitioners' training and official roles tend to ignore the political dimension of their trade, which can result in bewilderment when it comes to navigating policy worlds. Arguably, this limits the traction of deliberative processes by having their weakest link precisely at the stage where further impact is at stake. This offers lessons for those of us involved in training public engagers: alongside traditional science communication, they would be well served by practice-oriented training in dialogic facilitation and policy work (see Escobar 2012).

What was taken to the Scottish Parliament anyway? It was basically a report summarising the BID process, including key points of agreement, reached through deliberation by a diverse range of experts and lay participants in a cumulative process –informed by a parallel public

survey (Wardlaw *et al.*, 2011b). The BID exemplified the difficulty of arriving to a consensus on what constitutes evidence to be considered for policy making. Rather than unshakeable evidence, policy makers got recommendations based on current uses of the technology, speculations about future developments, and clusters of ethical considerations and practical judgements based on complex deliberative inquiry. In other words, instead of final scientific truths, they received the more constructivist type of deliberative truth: a set of temporary agreements within an ongoing conversation.

From such amalgam, policy makers face the challenge of elucidating implications for further consultation, deliberation and potential regulation (Head, 2008). During our visit to the Parliament, an influential policy maker put it bluntly: "this report is all very well, but to circulate this to relevant committees and include it in the agenda I need a 1-pager with six bullet points". There can be important problems with such processes of distillation. They might create a false appearance of consensus. The BID did produce certain level of consensus in terms of the need for regulation and a watchdog for non-medical uses of BIT. However, it was a complex, nuanced consensus with lots of footnotes and balances between critical reflection and the avoidance of unnecessary regulatory burdens. Nonetheless, the BID organisers failed on a basic aspect of policy work at the agenda-setting stage, namely, the distillation of complex outputs into a clear presentation of brief and persuasive arguments.

It is also tempting to ponder over how these policy makers and parliamentary researchers regarded the BID and its report. Perhaps they understood this community of inquiry as an advocacy coalition, or as an interest group pushing for a set of recommendations. My reading is that the BID organisers failed to explain that this was part of a deliberative process, rather than a lobbying one, and that its goal was to stimulate further public and policy deliberation. If the engagers had managed to explain that, perhaps decision-makers might had considered the advantages of upstream policy deliberation about this emerging issue. In the end, the issue -in its current form- was not deemed worthy of entering the agenda. The groundwork done during the BID seems therefore in vain, at least for the moment.

Upstream engagement, downstream policy making?

Imagine that a recruitment company sets headquarters in Edinburgh to launch their new range of services. They use Brain Imaging Technology to scrutinise prospective employees and screen behavioural propensities (e.g. absenteeism) in order to select the right individuals for

the right jobs[9]. The next day a newspaper runs the story: "Scientific advances in brain scanning undermine worker's rights". A pundit comments: "scientific communities work in the shadows of society, advancing technologies used for dubious purposes. When will scientists learn to discuss new technologies before things get out of control?"

Avoiding that type of scenario was, according to its organisers, the goal of the Brain Imaging Dialogue: to carry out upstream engagement in order to avoid uninformed "hysteria" and knee-jerk policy reactions. In many ways, this was a rather elitist process –although this might probably satisfy those critics who call for expert-led policy deliberation based on the "best available evidence" (Tait, 2009: p. 21). Indeed, the BID featured some of the foremost international experts, whose job was to help participants to explore the technical, ethical and political dimensions of BIT. There were also efforts to include citizens by using news releases, invitations through various networks and a public survey. The organisers wanted to take the pulse of this scientific community, as well as call upon multi-disciplinary experts and specific publics (i.e. patients) to explore the issues in a safe space.

PE practitioners face the dilemma of working out when to engage wider publics. If a scientific community is divided (i.e. on whether BIT can provide certain types of evidence), shouldn't they first reach some consensus in order to clarify what the technology can and cannot do? This goes along the lines of what Collins et al. (2010) call the 'technical phase' (for a critique see Fischer, 2009: Ch. 5). If the technology is underdeveloped, will publics be interested in participating and will policy deliberation be relevant? Before the BID, one of the organisers was very concerned about how the wrong media exposure could actually make this process counterproductive. Accordingly, they sought to create a space where they could be self-critical without being self-defeating. They wanted to consider whether there was a need for regulation to ensure that they could carry on doing research, and that non-medical uses of the technology would not produce the media frenzy and public outrage that had stopped other research areas on their tracks. That was their agenda, and indeed various voices during the BID made the case for and against it.

A key challenge in upstream engagement is how to feed results into policy deliberation (Stilgoe, 2007: p. 33). Notwithstanding noticeable exceptions (Datta, 2011: pp. 6-7), and given that government-sponsored upstream engagement rarely has a clear link to policy making (Irwin, 2006: p. 313; Hoppe, 2011: p. 180; Pieczka and Escobar, 2013), it is unsurprising that reports from deliberative processes often fall into a vacuum. As some argue, "establishing a linkage between deliberative processes and policy outcomes is inevitably

[9] A scenario based on current non-medical uses of BIT considered during the BID (see Wardlaw et al., 2011a).

difficult at the best of times and moving debate upstream is unlikely to make this situation any easier" (Rogers-Hayden and Pidgeon, 2007: p. 360). Therefore, how can upstream deliberative engagement foster and feed into upstream policy making? As Hagendijk and Irwin have noted, "bureaucratic structures tend to subsume deliberative exercises within conventional processes, and return quickly to 'business as usual'" (2006: p. 182) . The BID represents yet another example of how the impact of deliberative practice can be limited by its inadequate fit with ongoing policy making processes in Scotland, including bureaucratic habits, party politics and traditional agenda-setting processes (see Davidson *et al.*, 2011). In other words, the BID exemplifies a mismatch between upstream public engagement, and the downstream nature of some policy making.

Concluding thoughts: A Deliberative Uptake Office?

Following PE practitioners throughout a long deliberative process has led me to the puzzle that underpins this otherwise normative closure to the BID case study. Many organisations and networks in the UK are setting up PE processes that include some deliberative component. They all face the same challenge: "talk of engagement can backfire unless it has a demonstrable impact. Those whose engagement is being sought need to know that their participation will affect the policies and processes under discussion" (Wilsdon and Willis, 2004: 16). I began this paper interviewing a seasoned engager involved for the first time in organising policy-oriented deliberation. I recently asked her how this experience compares to her traditional PE activity. She highlights the frustration produced by the "lack of control and dependence on other parties […] which act as gatekeepers to the policymakers", the "longer timeframes" and also that it is "harder to identify the outcomes as there is no feedback":

> I'm used to things getting done in a quick timeframe and in a no-nonsense manner and we are not really set-up for longer timeframes […] and this makes it difficult for us to keep pursuing things over many years […]. Still, with [3 organisers] and myself on permanent contracts, perhaps we can keep pursing this, *if only we knew where to go next...*

It is not only, as Kadlec and Friedman (2007: 19) argue, that deliberative practitioners often "feel as if their work is done when deliberations conclude and a report is written", but also that they rarely know *where to go next*. This begs reflection on the apparent lack of pathways for deliberative outputs. There is perhaps a challenge around systemic incentives regarding the types of input that enter policy making arenas. From the perspective of PE practitioners like the ones involved in the BID, there seem to be no clear pathways for the parliamentary uptake of results from external deliberative processes. For some scholar-practitioners the problem is that

> those with real power to shape policy are under no obligation to respond to the outcomes of even the most conscientiously designed instances of public deliberation. Rather, in most instances deliberative processes are such that decision-makers and influencers can choose to respond to them or not *at their discretion*. The result is that the potential role that deliberation might play in public life is diminished as power politics picks up where deliberation leaves off. (Kadlec and Friedman, 2007: 18 original emphasis)

This relates to what Goodin and Dryzek call "the problem of how the macro-political 'takes up' the micro-deliberative" (2006: p. 223). It seems reasonable that "for engagement to make a difference, institutions need to innovate" (Stilgoe, 2007: p. 32). One tentative response might be to set up what could be called the Deliberative Uptake Office (DUO). It could sit alongside SPICe (Scottish Parliament Information Centre -the research unit that brokers evidence for policy makers). They might begin by convening a community of inquiry to establish standards to analyse and categorise deliberative PE processes. Benchmarks such as transparency (audit trail), depth, inclusivity or representation (a range of stakeholders, discourses and views), etc, could function similarly to the current criteria used by SPICe to filter external research. When deliberative processes comply with certain standards, their outputs would enter the pool of discursive resources available in parliamentary arenas.

The DUO would be a clearly located entry point for outputs from deliberative processes, appropriately translated for policy work consumption. Currently, most of those outputs never reach policy-making arenas, and a lot of energy, resources, and public trust are squandered because of a lack of clear channels to feed into policy deliberation. Moreover, the DUO would represent a stimulus for bottom-up participatory processes. Communities of policy and practice that foster deliberative processes would have clear incentives to establish high procedural standards. It would also be a statement about what kinds of input is welcomed by the Scottish Parliament. To be sure, I am not arguing

> that leaders are generally obligated to do everything that a deliberative assembly recommends as if it were an exercise in direct democracy. […] We do think, however, that leaders and experts are well served, and in a very real sense obligated […] to take seriously sincere and carefully constructed deliberations […] and to respond to them in authentic ways that move the policy process and debate forward. (Kadlec and Friedman, 2007: p. 21)

In their recent *International comparison of public dialogue*, Sciencewise –the UK Government-sponsored Expert Centre on science policy deliberation- proposes to create a "government-backed but independent National S&T Engagement Institution" modeled on "government-funded technology assessment institutions (such as the Danish Board of Technology and the Dutch Rathenau Institute)" (Sciencewise, 2011: p. 56). It would work towards integrating participatory and representative politics in the S&T world, fostering "third generation engagement" (Ibid.). Basically, they call for a top-down institution that

promotes and organizes deliberative processes directly connected to policy making. There is merit in this proposal, however, it still ignores independent and bottom-up processes and the deliberative learning they can produce –as illustrated by the BID case. Furthermore, it establishes as "legitimate deliberation" only what comes from government-sponsored processes, and arguably risks accentuating the problem of managerial, rather than democratic, uses of participation. Instead, I would argue that a more desirable scenario may be to let the deliberative modus operandi spread across multiple communities of place, practice and interest. Otherwise, we face the prospect of participatory politics that only matter when they are performed in top-down "invited spaces" (Cornwall, 2008) rather than on alternative public spheres.

All in all, the BID case suggests a policy paradox. Prominent science policy networks are investing discourse and capital in the notion of upstream PE (Pieczka and Escobar, 2013). However, upstream deliberative processes are difficult to connect to the realm of policy making for a variety of reasons outlined earlier –e.g. timing, form, lack of policy know-how.If the point of upstream engagement is to stimulate proactive policy deliberation, then the BID can be seen to have failed. Nevertheless, there is also an institutional dimension to this failure in meaningfully connecting public and official spheres. As Hoppe (2011: p. 180) argues, authorities that stimulate deliberative experiments "but fail to institutionalise relations between deliberative procedures, representative bodies and their normal processes of decision making, do indeed deserve suspicion;" furthermore, by "keeping open the option for themselves to not even respond to the outputs and recommendations, they give the impression of not taking seriously procedures they have themselves set in motion". Arguably, there is much to be done to build the deliberative capacity, and policy know-how, of organisations and PE practitioners (Escobar, 2012). Moreover, deliberative policy making is complex and troublesome –but so it is technocratically informed representative policy making (see Fischer, 1990, 2003, 2009). Deliberative processes seek deeper and more legitimate PE based on the recognition that although science may be able to tell us what we *can do*, it cannot possibly tell us what we *should* do –that is the realm of democratic engagement, where new deliberative methods can be helpful (Escobar 2011b). For those worried about the "tyranny of participation" (Cooke and Kothari, 2001; Tait, 2009), suffice to argue that deliberative processes, by definition, never bring total closure: their decisions represent temporary agreements within ongoing conversations. The end of a deliberative community of inquiry, such as the BID, is to meaningfully advance those conversations.

References

Bauer, M. W. & Jensen, P. (2011) The mobilization of scientists for public engagement. *Public Understanding of Science,* 20(1)**,** 3-11.

Besley, J. C. & Nisbet, M. (2011) How scientists view the public, the media and the political process. *Public Understanding of Science***,** Published online, 30 September 2011.

Bevir, M. & Rhodes, R. A. W. (2003) *Interpreting British governance,* London: Routledge.

Bohman, J. (1999) Democracy as inquiry, inquiry as democratic: Pragmatism, social science, and the cognitive division of labor. *American Journal of Political Science,* 43(2)**,** 590-607.

Braun, K. & Schultz, S. (2010) " ... a certain amount of engineering involved": Constructing the public in participatory governance arrangements. *Public Understanding of Science,* 19(4)**,** 403-419.

Burchell, K., Franklin, S. & Holden, K. 2009. *Public culture as professional science: final report of the ScoPE project – Scientists on public engagement: from communication to deliberation?* London: BIOS, London School of Economics and Political Science. Available: http://www.lse.ac.uk/collections/BIOS/scope/scope.htm [Accessed 1 March 2010].

Callon, M., Lascoumes, P. & Barthe, Y. (2009) *Acting in an uncertain world. An essay on technical democracy,* Cambridge; London: MIT Press.

Chilvers, J. (2008) Deliberating competence - Theoretical and practitioner perspectives on effective participatory appraisal practice. *Science Technology & Human Values,* 33(2)**,** 155-185.

Chilvers, J. 2010. *Sustainable participation? Mapping out and reflecting on the field of public dialogue on science and technology*. Harwell:: Sciencewise Expert Resource Centre. Available: http://www.sciencewise-erc.org.uk/cms/sciencewise-erc-resource-library/ [Accessed 20 June 2011].

Colebatch, H. K. (ed.) (2005) *The Work of Policy: An International Survey,* Oxford: Lexington Books.

Colebatch, H. K., Hoppe, R. A. & Noordegraaf, M. (2010) Working for policy. Amsterdam: Amsterdam University Press.

Collins, H. (2009) We cannot live by scepticism alone. *Nature,* 458(7234)**,** 30-30.

Collins, H., Weinel, M. & Evans, R. (2010) The politics and policy of the Third Wave: new technologies and society. *Critical Policy Studies,* 4(2)**,** 185 - 201.

Cooke, B. & Kothari, U. (eds.) (2001) *Participation. The new tyranny?,* London: Zed Books.

Cornwall, A. (2008) Democratising engagement. What the UK can learn from international experience. London: DEMOS.

CORTEX (2011) Special section of CORTEX: Discussion forum. *CORTEX,* 47(10).

Czarniawska, B. (2008) *Shadowing: And Other Techniques for Doing Fieldwork in Modern Societies,* Malmö: Liber and Copenhagen Business School Press.

Datta, A. 2011. *Lessons from deliberative public engagement work: a scoping study*. Overseas Development Institute. Available: http://www.odi.org.uk/resources/details.asp?id=6161&title=public-partcipation-engagement [Accessed 13 December 2011].

Davidson, S., Stark, A. & Heggie, G. (2011) Best Laid Plans … The Institutionalisation of Public Deliberation in Scotland. *The Political Quarterly,* 82(3)**,** 379-388.

Dryzek, J. S. (2010) *Foundations and frontiers of deliberative democracy,* Oxford: Oxford University Press.

Dryzek, J. S. & Niemeyer, S. (2010) Representation. *In:* DRYZEK, J. S. (ed.) *Foundations and frontiers of deliberative democracy*. Oxford: Oxford University Press.

Emerson, R. M., Fretz, R. I. & Shaw, L. L. (1995) *Writing ethnographic fieldnotes,* Chicago; London: University of Chicago Press.

Escobar, O. 2011a. *Public dialogue and deliberation: A communication perspective for public engagement practitioners*. Edinburgh: Edinburgh Beltane -UK Beacons for Public Engagement. Available: www.beltanenetwork.org/resources/beltane-publications [Accessed 13 December 2012].

Escobar, O. (2011b) *Public dialogue and deliberation: A communication perspective for public engagement practitioners,* Edinburgh: Edinburgh Beltane -UK Beacons for Public Engagement.

Escobar, O. (2011c) The work of participation: local deliberative policy making as mediated by public engagement practitioners. *Political Studies Association Annual Conference.* London.

Escobar, O. (2012) The politics of dialogue. *People & Science.* June ed. London: British Science Association.

Faulkner, W. 2011. *Dialogue in public engagement: A handbook*. Edinburgh: Edinburgh Beltane -UK Beacons for Public Engagement. Available: www.beltanenetwork.org/resources/beltane-publications [Accessed 13 December 2012].

Fischer, F. (1990) *Technocracy and the politics of expertise*, Newbury Park ; London: Sage.

Fischer, F. (1993) Reconstructing policy analysis: A post-positivist perspective- Reply. *Policy Sciences,* 25(3)**,** 333-339.

Fischer, F. (2003) *Reframing public policy: discursive politics and deliberative practices*, Oxford: Oxford University Press.

Fischer, F. (2009) *Democracy and expertise: reorienting policy inquiry*, Oxford: Oxford University Press.

Flyvbjerg, B. (2001) *Making social science matter. Why social inquiry fails and how it can succeed again*, Cambridge: Cambridge University Press.

Flyvbjerg, B. (2004) Five misunderstandings about case-study research. *In:* SEALE, C., GOBO, G., GUBRIUM, J. F. & SILVERMAN, D. (eds.) *Qualitative Research Practice.* London and Thousand Oaks, CA: Sage.

Forester, J. (1999) *The Deliberative Practitioner. Encouraging participatory planning processes*, Cambridge, Mass.: MIT Press.

Geertz, C. (1973) *The interpretation of cultures: selected essays*, New York: Basic Books.

Goodin, R. E. & Dryzek, J. S. (2006) Deliberative impacts: The macro-political uptake of mini-publics. *Politics & Society,* 34(2)**,** 219-244.

Hagendijk, R. & Irwin, A. (2006) Public deliberation and governance: Engaging with science and technology in contemporary Europe. *Minerva,* 44(2)**,** 167-184.

Haley, J., Wardlaw, J., Schafer, B. & Sandercock, P. (2011) Neuroscience in fashion. *Advances in Clinical Neuroscience and Rehabilitation,* 11(3)**,** 44-45.

Head, B. W. (2008) Three lenses of evidence-based policy. *Australian Journal of Public Administration,* 67(1)**,** 1-11.

Hendriks, C. M. (2006) When the forum meets interest politics: Strategic uses of public deliberation. *Politics & Society,* 34(4)**,** 571-602.

Hoppe, R. (2011) Institutional constraints and practical problems in deliberative and participatory policy making. *Policy & Politics,* 39(2)**,** 163-186.

Horlick-Jones, T., Rowe, G. & Walls, J. (2007) Citizen engagement processes as information systems: the role of knowledge and the concept of translation quality. *Public Understanding of Science,* 16(3)**,** 259-278.

Irwin, A. (2001) Constructing the scientific citizen: science and democracy in the biosciences. *Public Understanding of Science,* 10(1)**,** 1-18.

Irwin, A. (2006) The politics of talk: Coming to terms with the 'new' scientific governance. *Social Studies of Science,* 36(2)**,** 299-320.

Irwin, A. & Wynne, B. (1996) *Misunderstanding science? : the public reconstruction of science and technology,* Cambridge: Cambridge University Press.

Kadlec, A. & Friedman, W. (2007) Deliberative Democracy and the Problem of Power. *Journal of Public Deliberation,* 3(1)**,** Article 8.

Kerr, A., Cunningham-Burley, S. & Tutton, R. (2007) Shifting subject positions - Experts and lay people in public dialogue. *Social Studies of Science,* 37(3)**,** 385-411.

Klug, A. 2000. *Address of the Royal Society President. Anniversary Meeting*. Royal Society. Available: http://royalsociety.org/about-us/history/anniversary-address/ [Accessed 9 September 2010].

Kurath, M. & Gisler, P. (2009) Informing, involving or engaging? Science communication, in the ages of atom-, bio- and nanotechnology. *Public Understanding of Science,* 18(5)**,** 559-573.

Lansdell, S. 2009. *The use of experts in public dialogue*. London: Sciencewise. Available: www.sciencewise-erc.org.uk [Accessed 1 August 2011].

Latour, B. (2004) *Politics of nature : how to bring the sciences into democracy,* Cambridge, Mass. ; London: Harvard University Press.

Latour, B. & Woolgar, S. (1979) *Laboratory life: the social construction of scientific facts,* Beverly Hills: Sage Publications.

Laws, D. & Forester, J. (2007) Learning in practice: Public policy mediation. *Critical Policy Studies,* 1(4)**,** 342 - 370.Mahony, N., Newman, J. & Barnett, C. (2010) *Rethinking the public : innovations and research, theory and politics,* Bristol: Policy.

Newman, J. & Clarke, J. (2009) *Publics, politics and power: remaking the public in public services,* Los Angeles, [Calif.] ; London: Sage.

Nicolini, D. (2009) Zooming in and zooming out: A package of method and theory to study work practices. *In:* YBEMA, S., YANOW, D., WELS, H. & KAMSTEEG, F. H. (eds.) *Organizational ethnography. Studying the complexities of everyday life.* London: SAGE.

Nutley, S. M., Walter, I. & Davies, H. T. O. (2007) *Using evidence. How research can inform public services,* Bristol: Policy Press.

Pellizzoni, L. (2001) Democracy and the governance of uncertainty - The case of agricultural gene technologies. *Journal of Hazardous Materials,* 86(1-3)**,** 205-222.

Pidgeon, N. & Rogers-Hayden, T. (2007) Opening up nanotechnology dialogue with the publics: Risk communication or 'upstream engagement'? *Health Risk & Society,* 9(2)**,** 191-210.

Pieczka, M. & Escobar, O. (2013) Dialogue and science: Innovation in policy-making and the discourse of public engagement in the UK. *Science and Public Policy,* 40(1)**,** 113-126.

Rayner, S. (2003) Democracy in the age of assessment: reflections on the roles of expertise and democracy in public-sector decision making. *Science and Public Policy,* 30(3)**,** 163-171.

Rogers-Hayden, T. & Pidgeon, N. (2007) Moving engagement "upstream"? Nanotechnologies and the Royal Society and Royal Academy of Engineering's inquiry. *Public Understanding of Science,* 16(3)**,** 345-364.

Rogers-Hayden, T. & Pidgeon, N. (2008) Developments in nanotechnology public engagement in the UK: 'upstream' towards sustainability? *Journal of Cleaner Production,* 16(8-9)**,** 1010-1013.

Rowe, G., Horlick-Jones, T., Walls, J. & Pidgeon, N. (2005) Difficulties in evaluating public engagement initiatives: Reflections on an evaluation of the UK GM Nation? Public debate about transgenic crops. *Public Understanding of Science,* 14(4)**,** 331-52.

Sandercock, P. & Wardlaw, J. (2011) Brain imaging, the legal process and neurofantasy; can it be cured (by applying the principles of evidence – based medicine)? *SCRIPTed,* 8(2)**,** 204-211.

Schatz, E. (ed.) (2009) *Political ethnography: What immersion contributes to the study of politics,* Chicago and London: Chicago University Press.

Schon, D. & Rein, M. (1994) *Frame Reflection. Toward the resolution of intractable policy controversies,* New York: Basic Books.

Sciencewise. 2011. *International comparison of public dialogue on science and technology*. London: BIS (Department for Business Innovation and Skills. Available: http://www.sciencewise-erc.org.uk/cms/sciencewise-erc-resource-library/ [Accessed 20 June 2011].

Shields, P. M. (2003) The community of inquiry - Classical pragmatism and public administration. *Administration & Society,* 35(5)**,** 510-538.

Shields, P. M. (2004) Classical Pragmatism. *Administration & Society,* 36(3)**,** 351-361.

SINAPSE, Edinburgh-Neuroscience, SCRIPT, Joseph-Bell-Centre & Scotland's-Futures-Forum. 2010. *What are you thinking? Who has the right to know? Brain Imaging and its impact on society*. Glasgow: Scottish Universities Insight Institute. Available: http://www.scottishinsight.ac.uk/Programmes/Pastprogrammes/BrainImaging/Documents.aspx [Accessed 15 January 2011].

Smith, G. (2009) *Democratic innovations: Designing institutions for citizen participation,* Cambridge: Cambridge University Press.

Sprooten, E., Robinson, L. & M. Lawrie, S. (2011) Ethical Implications of Brain Imaging in Psychosis and Psychopathy *SCRIPTed,* 8(2)**,** 175-183.

Stebbing, M. (2009) Avoiding the Trust Deficit: Public Engagement, Values, the Precautionary Principle and the Future of Nanotechnology. *Journal of Bioethical Inquiry,* 6(1)**,** 37-48.

Stilgoe, J. (2007) Nanodialogues: Experiments in Public Engagement with Science. London: Demos.

Tait, J. (2009) Upstream engagement and the governance of science The shadow of the genetically modified crops experience in Europe. *Embo Reports,* 10**,** S18-S22.

Thorpe, C. (2010) Participation as Post-Fordist Politics: Demos, New Labour, and Science Policy. *Minerva,* 48(4)**,** 389-411.

Thorpe, C. & Gregory, J. (2010) Producing the Post-Fordist Public: The Political Economy of Public Engagement with Science. *Science as Culture,* 19(3)**,** 273-301.

Vierkant, T. (2011) Responsibility and the Automaticity Threat. *SCRIPTed,* 8(2)**,** 184-191.

Wardlaw, J., O'Connel, G., De Wilde, J., Haley, J., Shuler, K., Schafer, B. & Sandercock, P. (2011a) Neuroimaging in Society: legal, corporate, social and security implications. *Embo Reports,* 12**,** 630-636.

Wardlaw, J. M., O'Connell, G., Shuler, K., DeWilde, J., Haley, J., Escobar, O., Murray, S., Rae, R., Jarvie, D., Sandercock, P. & Schafer, B. (2011b) Can it read my mind? What do the public and experts think of the current (mis)uses of neuroimaging? *Public Library of Science, PLoS One,* 6(10)**,** e25829.

Warner, M. (2002) *Publics and counterpublics,* New York: Zone Books.

Wenger, E. (1998) *Communities of practice : learning, meaning, and identity,* Cambridge, England: Cambridge University Press.

Wilsdon, J. & Willis, R. 2004. *See-through Science: Why public engagement needs to move upstream*. DEMOS. Available: www.demos.co.uk/files/Seethroughsciencefinal.pdf [Accessed 5 July 2011].

Wilsdon, J., Wynne, B. & Stilgoe, J. 2005. *The public value of science. Or how to ensure that science really matters*. DEMOS. Available: www.demos.co.uk [Accessed 4 August 2009].

Yanow, D. (2009) Dear author, dear reader: The third hermeneutic in writing and reviewing ethnography. *In:* SCHATZ, E. (ed.) *Political ethnography: What immersion brings to the study of power.* Chicago: University of Chicago Press.

Yanow, D. & Schwartz-Shea, P. (2012) Interpretive approaches to research design: Concepts and processes. New York: Routledge.